Meeting Summary

Day 1: February 14, 2013

1. Welcome and Introductions

The meeting was called to order at 9:05 a.m., February 14, 2013, by the Chair of the Delta Independent Science Board (ISB or the Board), Dr. Richard Norgaard. Six members of the Board were present: Tracy Collier, Harindra (Joe) Fernando, Jay Lund, Richard Norgaard, Vince Resh, and John Wiens. One member participated by phone: Brian Atwater. Absent members included: Judy Meyer, Liz Canuel, and Ed Houde.

None of the Delta ISB members made any new disclosures.

Delta Science Program (DSP) Staff in attendance: Peter Goodwin, Lauren Hastings, and Joanne Vinton.

2. Delta Stewardship Council (DSC) Chair's Report and Executive Officer's Report

Chair Phil Isenberg talked about his comments for the UC Davis California Water Policy Seminar and Judge O'Neill's January 30 ruling on the smelt and salmon biological opinions. Isenberg also asked the Delta ISB to provide guidance on clarifying adaptive management as described in the administrative draft of Chapter 7 (proposed governance) of the BDCP.

Additional discussion among the Board members and Isenberg occurred regarding the court decision to allow a three-year delay. Some felt it was reasonable due to the complexity of the problem but others felt that three years was too long for planning and too short to implement an effective adaptive management experiment. Hastings stated that the delay was to accommodate the time needed to coordinate the two separate biological opinions and to conduct environmental review under the National Environmental Policy Act (NEPA).

Chris Knopp told the Board that DSC staff is working on responses to public comments on the Recirculated Draft Programmatic Environmental Impact Report (EIR) which reviewed the environmental consequences of the Delta Plan, and the proposed regulations which are based on the policies written into the final draft of the Delta Plan. DSC staff is expecting to finish by the first week of March and hopes to have the EIR and regulations in place by July 1.

The DSC wants the Bay Delta Conservation Plan to be successful. Adaptive management is foundational to its success. Lund expressed concern about the three years proposed to develop the adaptive management plan. Wiens suggested that the Board prepare guidelines for developing an adaptive management plan. Norgaard indicated concern about the temporal and spatial components of applying adaptive management in the Delta.

3. Delta ISB Chair's Report

Norgaard, Isenberg and Lund have been talking with Sam Luoma, editor-in-chief of the online journal *San Francisco Estuary & Watershed Science*, about publishing a paper on how to better synthesize science and how science can be more effective in making policy decisions. The paper would be written by scientists for managers. Collier mentioned that the Puget Sound Partnership is scheduling a two-day workshop to discuss the delivery of science to affect policy decisions. Norgaard has also been working with the International Panel on Climate Change (IPCC) on an updated report.

4. Lead Scientist's Report

Goodwin talked about the success of the CABA seminar held on January 18. The involved speakers are working on a paper which will be submitted to a scientific journal for publication. Other news included:

- One of the Science Program's State Fellows has developed an information sheet ("By the Numbers") which was presented at the last Delta Stewardship Council meeting that provides information on snowpack and precipitation. Goodwin also noted that a disproportionate number of delta smelt were being taken at the pumps as of the end of January.
- Announcement of a tool called Sacramento River Ecological Flows Tool (SacEFT) developed by ESSA Technologies, The Nature Conservancy, and other partners to help identify the relationship between flows and habitat.
- Research on the seismic stability of levees being conducted by UCLA scientists with a focus on the response of peat soils.
- Discussion of a Science Fellows solicitation for 2013, which will be announced soon.

5. Discuss Delta ISB business matters

Board members discussed the revised draft of their operating guidelines. The Board adopted the guidelines.

Board members voted for their next Chair and Chair-elect. Collier will be Chair and Lund will be Chair-elect. They will take office on June 1.

6. Habitat Restoration Review: U.S. Geological Survey (USGS) presentations and discussion

- CASCaDE model – Noah Knowles talked about the CASCaDE project, which began in 2006 as a climate change model for the Bay Delta. Click here to see the presentation, and view the website at http://cascade.wr.usgs.gov/. The website includes a description of the model, and links to reports and papers.

  Knowles described how global climate models are downscaled to the Delta region. He also described plans for the CASCaDE II model, which will link models for hydrology, sediment, fish, and more.

  Knowles said that he would like to incorporate habitat restoration into the model, but does not have time. Ideally, the model would tidally link specific projects, and then the model would be used to find an accretion rate that allows restored marshes to keep up with sea-level rise. The model cannot yet be used to prioritize restoration projects. Knowles makes USGS data available on the website, but he is not prepared to train others to use the model and is not currently funded to create a simpler model for use by others.

- Phytoplankton, clams, habitats, and restoration – Lisa Lucas talked about phytoplankton in the Delta, future productivity, the effect of non-native clams, and the use of a mathematical model. Click here to see the presentation. The presentation was a summary of her recently published paper, which is available at http://www.esajournals.org/doi/pdf/10.1890/ES12-00251.1.

  The model will be further developed to include horizontal movement of phytoplankton when the model is incorporated into CASCaDE. Lucas said that simple models can guide professional judgment, but cannot be used alone to determine how a specific site

should be restored. The model is a local model, so cannot be used to predict locations where clams might be abundant. The abundance of clams can be determined only by modeling a wider area.

- *Potamocorbula* – Jan Thompson talked about biomass and grazing of *Corbicula*, and *Potamocorbula* today and in the future. Click here to see the presentation. She stressed the importance of considering both clam species when planning restoration projects. The two species can overlap in the low salinity zone.

  Phytoplankton production is determined by much more than the distribution of clams. Adult clams tolerate a wider range of salinity. The juveniles are limited by a salinity of two, but, in general, both clams are difficult to limit. *Potamocorbula* might be limited by the salinity limits on reproduction. *Corbicula* are somewhat limited by temperature. Both species can inhabit channels, sloughs, lakes, and rivers, but neither do well with frequent and prolonged exposure. *Corbicula* are known to invade restoration sites.

  Huge amounts of fresh water would be needed to eliminate *Potamocorbula*. Studies at Prospect Island and Liberty Island showed that clams are living in both places. They have not been found at Mildred Island, possibly because the sediment is too coarse.

  Corbicula could be considered the "ideal" clam to move into newly restored areas and climate change may increase its reproductive period. Both species do well in shallow water and as a result, restoration options may be limited with the best option being seasonal flooding such as occurs in the Yolo Bypass. Thompson cautioned that based on what is known today, it may not be possible to create more phytoplankton in shallow water for export as the clams will simply become more prolific and consume what is produced before it can be exported.

- Marsh restoration in San Francisco Bay – Isa Woo and Lacy Smith talked about their tidal marsh research. Click here to see the presentation. Click here to go to the website. Woo and Smith work at the San Francisco Bay Estuary Field Station in Vallejo.

  Woo presented their tidal marsh conceptual model, which is a continuum from shallow subtidal to salt marsh. She also talked about public outreach for the Nisqually Delta Restoration and Tidal Marsh Monitoring projects. Field Station research projects include studies of bird communities in tidal marshes, invertebrate densities in different habitats, experiments on the reproductive capacity of common pickleweed, effects of climate change, and salt pond ecology.

  Smith discussed salt pond projects in north and south San Francisco Bay. She is collecting long-term data which can be used to understand the effects of multiple restoration projects. Projects include monitoring, studies on water quality and bird communities, and experimental design at restoration sites. Restoration projects include management of ponds for migratory waterbirds. When restoring a site, the planners try to balance the needs of different bird species, so that both current and new species use the site.

  Salt pond survey data are used for adaptive management. USGS has not developed an adaptive management framework, but USGS researchers participate in working groups and answer questions that help others use adaptive management. Landowners, such as the US Fish and Wildlife Service, along with the San Francisco Bay Joint Venture, make decisions about adaptive management for the restoration sites.

  King tides are a threat to wildlife, but they also bring a big pulse of sediment to the marshes.

7. Discuss BDCP Draft EIR/EIS review

Board members discussed their review of BDCP's proposed implementation structure described in Chapter 7 and their memo to the DSC. Overall, the Board 1) felt that the structure and use of science during implementation did not appear to be independent, 2) thought that it would be difficult for the adaptive management team to function due to conflicting agency mandates, 3) did not agree with placing science under management rather than being parallel to management, and 4) felt that a diagram to show the structure is needed. The Board also noted that Chapter 7 refers to an implementing agreement which was not available yet, and therefore could not be reviewed. From the description in Chapter 7, it was not clear how the state will actually implement the structure. The implementation structure needs to be flexible and not ponderous.

Suggestions in the Board's original memo were not implemented. Members agreed to restate those suggestions, making them stronger but in a cooperative and reasonable manner. The Board was especially concerned about its initial suggestion to BDCP to not create a separate, stand-alone science program.

The Board discussed which points in its memo are less important and can be put into an appendix. Members agreed that points seven through ten will be moved to an appendix. Point four will be expanded.

Knopp asked if the Board's memo will address consensus. Norgaard said that the Board will make the point more strongly that Chapter 7 needs to consider dissenting opinions.

Collier asked Carl Wilcox of the California Department of Fish and Wildlife (CDFW) for the Department's opinion on the implementation structure. Wilcox told the Board that the structure needs to be considered within the broader context of the Delta Plan and Delta science. He said that the structure needs to be collaborative. Issues are that the BDCP needs to comply with the California and Federal Endangered Species Acts, and needs to be incorporated into the Delta Plan, but decisions need to be made about what that means. Chapter 7 is closely tied to Chapter 3, which is not finished, and not meant to stand alone. The earlier version of Chapter 3 is out of date. Wilcox suggested that the Board wait for Chapter 3 to be released before finishing the memo.

CDFW understands that the science needs to be independent. Wilcox said that the BDCP does not yet have a Delta Science Plan to tie to (the Delta Science Plan is currently being prepared by the Lead Scientist and Delta Science Program staff). The intent of the BDCP is to meet the coequal goals.

Lund said that the Adaptive Management Team (AMT) mentioned in Chapter 7 seemed to be isolated, so he asked that the next draft of Chapter 7 make the relationship between the AMT and managers more explicit.

Board members decided to provide an additional public comment period, to close on February 25, before finishing the memo.

Public comment

Tom Zuckerman, Central Delta Water Agency, asked the ISB to be bold about recommending that the BDCP have a strong science component. He said that as proposed, science will not have an important role in implementation of the BDCP.

Matt Conover, John McCormack Company Ranches, requested that water quality considerations be included as a high priority because the sediment loads contain heavy metals.

This information could then be used to prioritize restoration sites. For example, six heavy metals were found in an already highly polluted bio-hazard area at the Mokelumne-Cosumnes confluence on a previously presumed pristine control site. Concentrations were several times the legal limit. Distribution of these waters as a result of levee breaches should not be promoted without first cleaning up the pollutants. Funding lag times necessitate funds from the science program for drilling and site cleanups.

Steve Ottemoeller, Friant Water Authority, said that he is suspicious of models because they imply a precision that does not exist. He suggested that the memo delete the term "combat science." He said that Chapter 7 does not mention the formation of an independent science body. He thinks that the BDCP could be a way to bring together disparate views of science in the Delta. He encouraged the Board to be clear about the need for independent science and how cooperation and collaboration could occur.

8. Public Comment (For matters that were not on the agenda, but within subject matter jurisdiction of the Delta ISB.)

None.

4:42 p.m. – Adjourned

Day 2: February 15, 2013

1. Welcome

The meeting was called to order at 9:01 a.m., February 15, 2013, by the Vice Chair of the Delta Independent Science Board (ISB or the Board), Dr. Tracy Collier. Six members of the Board were present: Brian Atwater, Tracy Collier, Harindra (Joe) Fernando, Jay Lund, Vince Resh, and John Wiens. One member participated by phone: Judy Meyer. Dick Norgaard, Liz Canuel, and Ed Houde were absent.

Delta Science Program (DSP) Staff in attendance: Peter Goodwin, Lauren Hastings, and Joanne Vinton.

2. Discuss Review of State Water Resources Control Board's Bay Delta Plan Draft Substitute Environmental Document (SED) for San Joaquin River Flows and Southern Delta Water Quality

Three people from the State Water Resources Control Board (SWRCB) discussed the SED with the Board: Barbara Evoy, Deputy Director for Water Rights; Diane Riddle, Environmental Program Manager, Division of Water Rights Hearings and Special Programs Section; and Mark Gowdy, Senior Water Resources Control Engineer (WRCE), Division of Water Rights Special Projects Unit.

Board members expressed concern that the recommended flows might not be high enough to restore salmon. Riddle replied that the flows will be adaptively managed and that the SWRCB included the possibility of setting flows as low as 25 percent of unimpaired flow in case improvements to habitat were such that fish and wildlife would not be harmed at the lower flow level. However, this is not likely to happen in the short term.

Board members asked about SWRCB experience with adaptive management. Riddle said that use of adaptive management is a learning experience for SWRCB. She is hoping for guidance from the Board and the Delta Science Program.

Board members expressed concern that not enough attention is given to geomorphological effects of flows. Riddle said that flows big enough to affect the river channel are not likely, but she agreed that SWRCB should find out more about flows and geomorphological processes.

Board members asked about consideration of climate change. Riddle said that SWRCB will be responsive to it.

Board members asked about 14-day averaging of flows, which might make flows less natural. Riddle said that 14 days might be as close to real-time as possible, considering the needs of dam operators, who need to have some margin for planning.

SWRCB is not currently considering tributary flows upstream of the Merced River.

Board members said that monitoring plans and performance measures, as well as more detailed water quality and biological analytical tools, should be developed to aid in adaptive management of flows and other activities, given uncertainties in fish population responses.

The Board wrote a summary of its review of the SED and will send it to the SWRCB by the March 29 deadline.

3. Discuss Delta Science Program Strategic Plan

Goodwin discussed the most recent version of the Delta Science Program Transition Plan, formerly the Strategic Plan. Meyer suggested adding sections on conflict resolution and performance measures. Wiens suggested holding a monitoring workshop. Lund recommended consolidating some objectives so that the plan is easier to read.

Public Comment

Stephanie Fong, State and Federal Contractors Water Agency, suggested that a state agency organization chart be developed to help science fellows and future scientists decide where they might want to pursue a career. Regarding monitoring, Fong said that the California Water Quality Monitoring Council established the California Estuary Monitoring Workgroup, which is focusing on the Delta first. The workgroup is identifying key questions to assess the ecological health of the San Francisco Bay-Delta Estuary and plans to make data and methods available through a new California Estuaries Portal. The Delta Regional Monitoring Program steering committee is holding its first meeting on February 27. The committee has been asked to identify technical committees, priority management questions, and a monitoring and assessment framework.

4. Discuss Delta Science Plan

Goodwin presented the draft organization for the Delta Science Plan. Board member comments included: 1) add the 2012 National Research Council's recommendation for the lead scientist to shift from activities within the Delta Science Program (DSP) to a broader role in actively leading and synthesizing science efforts; 2) recognize the sovereignty of the agencies, but also provide leadership; 3) include NGOs and consultants in the plan; 4) increase the length of term for the lead scientist (two years is too short); 5) be aware that as science becomes more important, more attempts will be made to influence it; and 6) there are too many issues for centralized management.

5. Habitat Restoration Review: U.S. Geological Survey presentations and discussion (continued from February 14)

- Water quality – Jacob Fleck talked about Delta restoration and the Biogeochemistry Program. Click here to see the presentation.

Contaminant removal technologies (specifically, low intensity chemical dosing (LICD)) are being used to clean up drainage waters from subsided islands prior to discharge. Chemicals used are polyaluminum chloride, ferric chloride, and ferrous sulfate, which are also used in water treatment plants.

Findings from this program can be used to improve the design of restoration projects. For example, sills at the entrance to sloughs might trap more sediment than if the slough is completely open. Also, projects should be oriented so that they are away from heavy winds and the associated re-suspension of sediment.

- Atmospheric rivers – Mike Dettinger talked about the relationship between atmospheric rivers and salinity, levees, and floodplains in the Bay-Delta system. Click here to see the presentation.

  Dams have decreased snowmelt flows and flood flows, changing how the downstream environmental processes work. This needs to be considered when planning restoration projects.

  Meteorologists are able to forecast atmospheric rivers up to about 10 days in advance. They cannot yet forecast how many of these storms might hit the west coast in a specific year. The value of forecasts depends on the channel capacity of the river system that will be affected. For river systems with large capacity and channel width, reservoirs can be drawn down. For systems with small capacity, evacuations might need to be planned instead.

  Climate change models predict a 15-percent increase in the number and intensity of atmospheric rivers.

- Climate change modeling – Dan Cayan talked about planning for climate change in California. Click here to see the presentation.

  Lund said that Cayan communicates his findings well to the higher levels of state agencies, but the information does not seem to filter down to lower levels.

  According to early modeling, projected sea-level rise will be higher at the coast than in the Delta, but Cayan does not have exact estimates. Fresh water floods will have a greater effect in the Delta than sea-level rise combined with high tides.

- Sediment transport – Dave Schoellhamer and Scott Wright talked about habitat restoration and suspended sediment. Click here to see the presentation.

  Sediment cores were used to estimate the relative contributions of organic and inorganic deposits to marsh accretion. In the historical Delta, organic deposits were apparently more important because they formed peat. Currently, inorganic deposits might be more important.

  Sediment supply is decreasing due to diminishment of the hydraulic mining pulse, deposition in reservoirs and flood bypasses, river bank protection, and trapping by invasive submerged vegetation, but no studies have been done to quantify the relative importance of each activity.

  Data collected from this work are given to consultants to support development of sediment transport models.

- Hydrodynamics – Jon Burau talked about implications of restoration on hydrodynamic and transport processes in the Delta. Click here to see the presentation.

Currently, hydrodynamic models are being developed by consultants, not by state scientists. Delta science needs to support a professional modeling team because models are needed to predict how restoration projects will affect each other, and they are needed for adaptive management. The modeling team needs to include people to develop the models, people to run the models, and people to interpret the results.

Restoration projects need regional planning. Restoration of Prospect Island might not be the best place to start.

6. Discuss Habitat Restoration Review Report

The Board discussed the most recent version of its habitat restoration review report. The structure is going to change somewhat in the next version, which will include a vision statement. The number of recommendations will be reduced, and specific examples will be added. A section on research needs will also be added. Resh or Canuel will send the next version to DSP, who will forward it to the rest of the Board members for their comments.

Resh suggested that the Board discuss and formalize the process used for writing the habitat restoration review.

Public Comment

Dave Zezulak, California Department of Fish and Wildlife, said that most of the modeling presented at the meeting is being used to help understand present day flows and sediment transport for Delta restoration. He cautioned that much of that modeling is for the Delta as it is presently configured, with narrow rock-lined channels, gates that direct flows south, and large tracts of reclaimed farmland, some of which is deeply subsided.

An alternative "model" describes the Delta as it existed before the Delta was reclaimed and channelized—the historical ecological model produced by the San Francisco Estuary Institute. This view of a historic Delta helps to envision what could be restored to areas with proper elevations and flows, especially reconnection of the floodways to fresh water tidal areas. Restoration in these areas is self-sustaining and usually much cheaper than restoration projects forced into areas where they did not exist historically.

7. Public Comment (For matters that were not on the agenda, but within subject matter jurisdiction of the Delta ISB.)

Matt Conover, John McCormack Company Ranches, said that more public discussion of options are needed. He was concerned that Burau's hypothetical project to add gates is actually being considered. Board members assured Conover that Burau's project was for illustration purposes only.

8. Meeting outcomes

- Board members will decide which of them will represent the Board at the Interagency Ecological Program Workshop in April.
- Board members will write a paragraph on the SED for Lund's presentation at the Council meeting.
- The next meeting will be a teleconference. The date will be determined through a new poll and will include the last week in March.
- Public comment on the Board's memo on BDCP Chapter 7 will be extended to Feb. 25.

4:30 p.m. – Adjourned